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Financial Intermediation and Entry−Deterrence: A survey

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Abstract

In this paper, we summarize the findings of a series of our papers on the relationship between financial contracting and the game of entry−deterrence in a dynamic context.The incumbent has private information about its cost and enters into an agency relationship with a lender in each of the two periods. We examine the effect of this agency relationship on the probability of entry and limit pricing on the one hand and the effect of the game of entry−deterrence on the form of the financial contract on the other. The three papers make different assumptions about the uncertainty of demand and the informational structure.

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1. INTRODUCTION

Firms are routinely engaged in making both financial and real decisions and, generally, the two are related. For example, on the financial side, firms decide the type or method of financing as well as the type of financial contracts to engage in. On the other hand, firms make real decisions, such as setting output or price. The effects of both of these activities depend on various aspects of the financial and real markets, such as the competitive and informational environment. The relationship between the real and financial decisions made by firms is important, especially in the presence of private information since, lenders may gather information from activities in the real sector and similarly, rivals in the real sector may draw upon financial contracts a source of information. Recent empirical literature (Chevalier, 1995, Phillips, 1995, for example) shows a growing interest in the relationship between the real sector and financial contracts. For example, Chevalier examines the effect of leveraged buyouts on pricing as well as the probability of exit in the supermarket industry. Similarly there is empirical work that examines the effect of debt on the competitiveness of a firm (for example, Opler and Titman, 1994, Zingales, 1998 and Kovenock and Phillips, 1995).

In a series of papers, we study how the financial contracts of an incumbent firm influence its incentives and actions to discourage entry, in a dynamic context, under different assumptions regarding the uncertainty of demand as well as the informational structure of the environment. Specifically, we study how the financial contract between, say, a bank[1] and a monopolistic, incumbent firm changes, if the latter faces the threat of entry in the second period and how prices, outputs and the extent of entry change, given that the incumbent enters into financial contracts.[2] We allow both the incumbent and potential entrant to have private information about their costs since firms often have private information about their own costs or technology. Such information is valuable to lenders in the financial markets as well as to rivals or potential competitors. This modeling is also consistent with the early non-financial literature on entry-deterrence, Milgrom and Roberts (MR), 1982 and Matthews and Mirman (MM), 1983.

There are three games implicit in our models, the agency game between the bank and the incumbent firm, the entry game between the incumbent firm and the potential entrant and the Cournot game between the incumbent and the entrant in case entry occurs. It is the interaction between these games that yields the results on the relationship between the financial and the real decisions of the firms. We model the financial contract as a principal agent relationship between a lender and an incumbent firm, letting the lender be the principal and the incumbent be the agent. The competition between the incumbent and the potential entrant, however, is modeled along the lines of the literature on entry-deterrence,

[1] We use the term `lender' and `bank' interchangeably throughout.

[2] Some of the theoretical papers in the existing literature that study similar issues include Bolton and Scharfstein (BS), 1990, Brander and Lewis, 1986, Gertner, Gibbons and Scharfstein, 1988, Poitevin 1989, 1990, Maksimovic, 1990, Maksimovic and Titman, 1991 and Faure-Grimaud 1997, 2000.

in particular, MR and MM. Finally, if entry occurs, the two firms, the incumbent and the entrant, play a Cournot game. The effect of the asymmetric information, as well as the informational environment for learning, plays a crucial role in the interactions of these games.

We study the relationship between financial contracting and entry deterrence in these models under three different sets of assumptions regarding the informational environment, although the basis for all three models is the same. In Jain, Jeitschko and Mirman (JJMa) 2001, we assume that there is no uncertainty in the demand function and that the potential entrant is unable to observe the financial contract between the incumbent and the bank. This allows us to focus on the effect that the financial contract has on limit pricing as well as the effect of the threat of entry on the financial contract, abstracting from the issues of learning and experimentation. The lack of uncertainty implies that learning in the second period is complete if the financial contract in the first period is separating[3]. Further, since the financial contract is unobservable, the entrant must conjecture the outputs of the incumbent and thus the beliefs of the entrant play an important role in determining the equilibrium. In fact, the beliefs of the entrant actually dictate the equilibrium, if it exists. If the contract, in this nonrandom environment, is observed by the entrant, then the only equilibrium between the bank and the incumbent is the static contract, since the beliefs of the entrant are always correct and the same as the beliefs of the bank in equilibrium. Hence, in this case the question of limit pricing is irrelevant.

In JJMb and JJMc, we assume that the demand for the good is uncertain. The uncertainty in the demand function allows us to focus on the issues of information and learning since learning is not necessarily complete under uncertainty. Manipulating the flow of information becomes a critical feature of the contract between the incumbent and the bank, in contrast to JJMa. Not only does the bank account for the incumbent's incentives in attempting to preserve the informational rents over time (signal dampening), the bank also attempts to actively learn about the incumbent firm (experimentation).[4] We also consider two different scenarios regarding the observability of the financial contract. Under the first scenario (JJMb), the financial contract is observed by the entrant. This assumption simplifies the updating process since both the bank and the entrant must have the same posterior about the type of the incumbent. In the second scenario (JJMc), we assume that the financial contract is not observable. This assumption allows us to study the possibility of divergent beliefs of the bank and the entrant and thus the possibility of signal jamming[5]. We find that when the contract is hidden, the inability of the bank to credibly signal through the financial contract leads to a higher probability of entry than when the contract is public. That is, signal jamming occurs and leads to a higher probability of entry.

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[3] Only separating equilibrium contracts are discussed in this survey. The issue of the pooling contracts verses separating contracts is dealt with in JJMa.

[4] These informational effects in agency are first derived in Jeitschko and Mirman (JM), 2001 and Jeitschko, Mirman and Salgueiro (JMS), 2001. However, these papers do not have a game – for example, entry – in the second period.

[5] We make this assumption also in JJMa. However there, lack of uncertainty leads to complete learning and thus the possibility of signal jamming does not arise.

In all three papers, the optimal two-period financial contract without the threat of entry is first derived. Then we examine the effect of potential entry in the second period on the financial contract and the effect of the financial contract on the probability of entry and pricing and output decisions of the incumbent. In what follows, we lay out the basic framework, some key features of the model and the main results.

2. MODEL

The incumbent is assumed to have private information about its costs, which remains the same in the two periods. The incumbent is also assumed to need a fixed amount of capital in each period to operate, and borrows this capital from a bank. For convenience, we assume that the entrant does not need to borrow. The asymmetric information between the incumbent and the bank leads to an agency relationship between the incumbent and the bank in each period. This gives rise to a standard principal-agent problem where the agent's type is private information and both the principal and the agent share the profits resulting from the agent's hidden actions (see Laffont and Tirole, 1993, for example). The incumbent and the bank enter into short-term financial contracts that specify the repayment made by the incumbent, contingent on the observed price. These contracts induce each type of incumbent to produce the output that maximizes the bank’s profits.

We model the bank as the principal and the incumbent firm as the agent whose marginal cost of production, $\tilde{c}$, is its private information. It is assumed that the firm's cost can take two possible values, $\underline{c}$ and $\bar{c}$, where $\underline{c} < \bar{c}$. The bank believes that the probability that the incumbent's cost is low is ρ. The firm of type $\tilde{c}$ needs to borrow F dollars, in order to produce output, $\tilde{q}$. At the end of the first period, the bank observes the price of the good, p and updates its beliefs about the type of the incumbent and enters into another contract in the second period, conditional on this information. The bank maximizes its expected profits over two periods.[6] If the bank knew the firm's type, it would set the repayment equal to the incumbent’s profits. Given that the bank does not know the firm's type, the repayment must be contingent on the observed price p. When there is no uncertainty, as in JJMa, observation of p implies observation of output. When there is uncertainty, as in JJMb and JJMc, the price is only a signal of the output.

The risk neutrality of all players implies that there are an infinite number of repayment schemes that implement the second best outputs at equal cost for the bank. We present only the real implications of the equilibrium contract, i.e., the equilibrium outputs, expected profits, and expected repayments.[7] Thus the bank chooses the repayment-output pair for each type in JJMa (expected repayment and output in JJMb and JJMc), to maximize its profits, subject to the constraints that the incumbent of each type accepts the contract

[6] In these models the aim is to study the optimal contract without regard to the market structure of the banking industry.

[7] See JMS for an example of how an equilibrium contract is derived.

(individually rationality) and that the incumbent maximizes its profits (net of repayment) by producing the specified output and repaying the specified amount (incentive-compatibility).

The demand for the real good is assumed to be linear and uncorrelated over the two time periods. The demand function for the real good in JJMa is given by,

$$p = a - bq,$$

where q is the output. In JJMb and JJMc, demand is uncertain and thus the price of the good is given by,

$$p = a - bq + \varepsilon,$$

where ε is distributed uniformly over $[-\eta,\eta]$.

The structure of the entry game is similar to that of MM and MR. A crucial difference between MR and MM, on one hand, and our model, on the other, is the presence of financial dealings between the incumbent and the bank. We consider a sequence of short-term contracts: the bank lends to the incumbent in the first period, collects repayment at the end of the period, updates its beliefs about the type of the incumbent it is facing using Bayes' rule and designs a new contract in the second period. We assume that the entrant's cost of production c_e is also either $\underline{c}$ or $\overline{c}$, and is his private information.[8] Let the bank and the incumbent believe that c_e is $\underline{c}$ with probability μ. We further assume that the entrant incurs a fixed cost of entry k_e where k_e is either high or low depending on the type of the entrant.

The entry rule, for both certain demand and uncertain demand, is consistent with, MR and MM. In JJMa, we assume that the fixed cost of entry implies that entry is profitable if and only if the incumbent is inferred *not* to be the low-cost type. In JJMb and JJMc, we assume that the fixed cost is such that entry occurs if the incumbent is high cost and does not enter if the incumbent is low-cost. When the entrant does not know the incumbent's type, we show that the entrant enters. The entrant observes the price of the good at the end of the first period. Then, updates his beliefs about the cost of the incumbent, using Bayes' rule and chooses whether to enter, on the basis of these updated beliefs. Another difference between our work and MM and MR is that in our models there is an explicit game between the two firms if entry occurs. Indeed, in case of entry, a Cournot game ensues between the two firms. In MM and MR, this game is only implicit. In particular, the profits are not dependent on the decisions and beliefs, as in our models.

3. NO UNCERTAINTY

[8] This assumption is made only in JJMa, to be consistent with MR. In JJMb and JJMc, we assume that the entrant's cost is public knowledge.

In JJMa, we assume that the entrant is aware that the incumbent borrows from a bank but does not actually observe the contract. This means that the entrant must postulate expectations about the outputs of each type of incumbent and, thus, conjecture the equilibrium contract in the first period. Since there is no noise in demand, if a separating contract is implemented in the first period, the bank learns the type of the incumbent and thus offers the full-information contract in the second period, yielding zero payoff to the incumbent of either type, in the second period. To determine the optimal second-period contract, we start with a particular posterior of the entrant about the type of the incumbent, consistent with observed first-period output. Next, we solve for the optimal second-period contract between the incumbent and the bank, as well as the outputs of the incumbent and the entrant. If entry does not occur then the monopoly outputs are chosen for the incumbent by the bank. If entry occurs then the Cournot equilibrium level of output is chosen. This yields the second period profits of the bank, given the entry rule and the beliefs of the entrant.

Finally, we work backwards to find the optimal first-period contract between the bank and the incumbent. We find that the repayment scheme of the static, separating contract cannot be an equilibrium contract. This is true since the low-cost incumbent has an incentive to mimic the high-cost incumbent. To be specific, the first-period equilibrium contract must now allow a larger surplus for the low-cost incumbent than in the static case. This is the ratchet effect associated with dynamic agency models.

The addition of the threat of entry in the second period has an interesting effect on the repayment scheme of the first period financial contract. Specifically, due to the threat of entry, the ratchet effect is less severe because the low-cost incumbent invites entry by mimicking the high cost incumbent and thus lowers profits. As a result, the bank does not need to lower the repayment of the low-cost incumbent as much with entry as without. In this sense, the bank is better off with the threat of entry. However, entry also reduces the profits of the high-cost incumbent in the second period, making the bank worse off. We show that

- There are conditions under which the bank is better off in net terms, due to the threat of entry.

This result is interesting since the threat of entry is normally associated with lower profits and thus a less creditworthy incumbent. However, we show that when private information is present, increased entry can also have beneficial effects for the lender.

In addition to the changes in the repayment scheme of the first period financial contract, we show in JJMa how the first period output of the incumbent is affected by the beliefs of the entrant. Indeed, the equilibrium is dictated by the beliefs of the potential entrant. Specifically, we show that

- There exists an equilibrium in which there is no limit pricing by the incumbent, i.e., the incumbent does not increase its output to discourage entry.

Indeed, in this equilibrium, the outputs chosen by the bank for the two types of incumbent are the same as those without the threat of entry. That is, the low-cost incumbent produces the first-best output and the high-cost incumbent produces less than the first-best output. Thus, the resulting price level is the same as the monopoly price level (without the threat of entry) for the low-cost incumbent and higher than the monopoly price level for the high-cost incumbent. This result is in contrast to the work by MR where limit pricing occurs in every equilibrium.

The intuition for the absence of limit pricing is that while in the MR model, the price of the good is set by an incumbent who knows its own type, in our model, the bank, who does not know the type of the incumbent, chooses the parameters of the financial contract, including the price of the good. Thus, in the MR model, in the absence of an agency relationship, the low-cost incumbent chooses a price that the high-cost incumbent cannot mimic in order to discourage entry (this happens in every separating equilibrium), while in our model, the agency relationship between the bank and the incumbent leads to a contract that separates the types, thus, when consistent with the beliefs of the entrant, obviating the need for costly limit pricing. That is, if supported by the beliefs of the entrant there is no limit pricing in equilibrium, since the financial contract serves as a credible commitment to the outputs.

We also examine the effects of other possible beliefs of the entrant.[9] We find

- There are equilibrium beliefs of the entrant for which the bank finds it optimal to limit - price.

Note that the gain from limit pricing to the bank is deterred entry for the low-cost incumbent in the second period whereas the loss is lower first period profits. There is a range of outputs, at least as high as the first-best level, for the low-cost incumbent that is consistent with the entrant's beliefs as well as with the bank's profit-maximization. Thus limit pricing occurs in equilibrium for an interval of possible beliefs of the entrant. We characterize the set of separating equilibrium points with limit pricing by the low-cost incumbent.

Overall, the result of no limit pricing by the levered, incumbent firm is consistent with the BS result and the general spirit of results in the recent empirical literature that debt makes a firm less aggressive, in the sense that the price of the product is higher with debt than it is without debt. However, we show that higher prices do not necessarily imply loss of competitiveness. This is because first, the extent of entry is unchanged compared to the case when the financing decision is ignored (as in MR) or compared to the case where the

[9] This issue is different from the entrant having out of equilibrium beliefs.

entrant knows the cost of the incumbent. Second, the bank can profit from entry and thus need not lower the loan amount to the incumbent.[10]

4. UNCERTAINTY

Both JJMb and JJMc add uncertainty to the demand function. The difference between these two papers is the ability of the potential entrant to observe the contract. The presence of uncertainty implies that the equilibrium is no longer dictated by the beliefs of the potential entrant. Also, uncertainty, with enough noise, allows us to study only the separating contract[11] and also prevents complete learning in the second period. Indeed, the updating of beliefs plays a crucial role when learning is incomplete. In particular, due to the uniform noise and Baysian updating, there are three possibilities for the posterior beliefs. The types can be fully revealed to be either the 'good' or the 'bad' type or the posterior is the same as the prior beliefs. Thus, after observing the first period price and updating its beliefs about the cost of the incumbent the bank either believes it has inferred the type of the firm, or its posterior beliefs coincide with its prior beliefs. This is in contrast to JJMa where a separating contract reveals the type of the incumbent at the end of the first period. Third, under uncertainty, the repayment scheme, as well as the outputs of the incumbent, change, even without the threat of entry. Further, the threat of entry leads to a generalization of the results obtained by JM and JMS.

When there is incomplete learning in the second period, the optimal financial contract, in the first period, between the bank and the incumbent takes into account the possibility of another firm in the second period. The effect of the second period on the first period contract is especially important since the beliefs affect the output in the second period Cournot game. In particular, the second period contract no longer implies the first-best output for the low-cost incumbent, as is standard in agency models. Further, with uncertainty, the probability of complete learning depends on the first-period outputs. For example, the further apart are the outputs of the two types of incumbent the more informative is the observed price to the bank. In particular, the increased distance between the first-period outputs lowers the probability that the bank does not learn and increases the surplus left to the low-cost incumbent in the first period. Thus, uncertainty in the demand function creates an incentive for the bank to manipulate the first-period output levels to maximize its profits.

Indeed we find that:

- The bank sets the first-period outputs further apart due to the threat of entry.

[10] Although the amount of loan needed, F, is fixed in the model, the bank lends if and only if it makes positive expected profits. Since the profit may go up under the threat of entry, a higher F can be supported.

[11] See JMS for details.

This result is an outcome of two underlying factors. First, the low-cost incumbent's incentive to deviate, due to the signal dampening effect, is weaker due to both noise and entry. Second, the bank's expected profits from learning and experimentation increase. Both effects lead to the bank setting the first period outputs further apart, so that price observations are more informative, with the threat of entry. That is:

- The incentive to choose outputs closer together, due to the signal dampening effect, is smaller than in the model without entry.

The intuition for this result is straightforward. If the low cost incumbent mimics the high cost incumbent in the first period and successfully deceives the bank, the entrant is also deceived and entry is triggered. Profits, and hence the incumbent's payoffs, are lower after entry occurs. Thus, deviation from the contract is not as rewarding for the low cost incumbent when there is a threat of entry. Consequently, the bank does not have to alter the first period outputs as much since the threat of entry requires a smaller first period repayment of the low cost incumbent.

We also show that, in determining the first period outputs, the bank strategically experiments. Specifically:

- Due to the experimentation effect, the bank moves the outputs of the two types of incumbent further apart, as compared to the model without entry.

The intuition for this result is driven by the entry rule. Since the entrant does not enter if the incumbent is inferred to be low-cost, the bank has additional incentives to induce more information and thus deter entry. That is, the bank has an incentive to set the first-period outputs further apart due to the strategic experimentation effect. Thus, as stated above, the combined effect of signal dampening and strategic experimentation due to entry is that the bank sets outputs further apart in equilibrium with entry than without and thus makes the observed first period price more informative and reduces the probability of entry.

Note that the reduction in the probability of entry is different from traditional limit pricing. First, the bank does not have any information that it could signal to the incumbent. Second, the bank manipulates the outputs and hence the price differently then in the nonfinancial entry models. Specifically, the bank increases the low - cost incumbent's output---just as in traditional limit pricing---but it decreases the high-cost incumbent's output relative to the model without the threat of entry. In traditional limit pricing, the high-cost incumbent's output remains unchanged (in the separating equilibrium).

We also find that

- When the observed first period price does not reveal the type of the incumbent, the second-period financial contract does not yield the first-best level, that is, the level produced in the absence of the agency problem, for the low-cost incumbent's output.

This result is interesting since in standard static principal—agent environments, the low-cost incumbent produces the first best output while the high-cost incumbent's output is distorted below its first best output. The threat of entry leads the bank to distort the outputs of both types of incumbent. The reason for this is that the high cost incumbent and the entrant play a game in which all outputs are related. This possibility does not arise without uncertainty (JJMa) because there is complete learning and thus the financial contract in the second period is derived under full information.

Another result under uncertainty derived in our work is that

- The incumbent's *expected* output in the second period when his type is unknown to the bank and the entrant, is equal to the first best level of the high cost firm, after entry has occurred.

This has an interesting implication for the entry rule. The entrant enters if and only if the incumbent is not low-cost. In other words, although posterior beliefs take on three possible values, the entry rule only distinguishes between two cases: the incumbent is believed to have low cost and the incumbent *may* have high cost. This, in turn, implies that the probability of entry is decreasing in the distance between the outputs produced by the low-cost and the high-cost incumbent in the first period. This result is important in its own right since it is used to study Signal Jamming in the next section.

5. SIGNAL JAMMING

Finally, we consider the scenario when demand is stochastic and the entrant observes the price of the good but *does not* observe the financial contract (JJMc). This leads to the possibility that the entrant and the lender have different beliefs about the incumbent's costs, due to uncertainty in demand. Since the entrant cannot observe the contract, he must make conjectures about the outputs of the incumbent. Moreover, the bank (and the incumbent) must now conjecture the beliefs of the entrant in determining the optimal financial contract and the real decisions. This leads to `signal jamming,' that is, given the potential entrant's beliefs about a contract, the bank and incumbent firm may attempt to deviate from the potential entrant's conjecture in an effort to affect the entrant's real decisions.[12] Of course, any such attempt is anticipated by the potential entrant so that, in equilibrium, the bank and the potential entrant have the same beliefs.

In our model, the bank can expect to obtain a higher second period payoff if there is no entry, simply because the incumbent firm generates higher profits when operating as a monopolist in the second period than when it faces competition. Consequently, the bank has an incentive to adjust the contract with the incumbent firm in an attempt to reduce the

[12] Notice that this cannot occur in JJMa due to lack of uncertainty.

probability of entry. However, given any conjecture of the potential entrant about the first period outputs of the incumbent, the bank is unable to affect the entrant's entry rule. That is, the bank is not able to trigger a different entry decision, given an observed price. However, the bank can affect the probability of different observed prices as the equilibrium outputs implied by the contract determine the distribution of observed prices and thus affect the probability of entry.

Signal jamming has been studied in other contexts, most recently in Jain and Mirman, 2000 where an uninformed multinational firm signal jams to manipulate the beliefs of the informed domestic firm. They show that signal jamming leads the informed domestic firm to produce a higher output and the multinational to produce a lower output. Signal jamming occurs there due to the unobservability of outputs produced by each firm. In this paper, signal jamming occurs due to the unobservability of the financial contract by the potential entrant.

Two steps are necessary in formalizing and evaluating the effect of signal jamming. First, it must be determined how changes in the first period outputs affect the distribution of first period prices and thus the probability of entry. Second, the benefits of such manipulation must be quantified. To quantify the bank's incentives to manipulate entry, we evaluate the bank's second period payoffs in five distinct constellations of beliefs in the second period. Whenever the bank and the potential entrant have the same posterior beliefs, the analysis of the observable contract case applies. Consequently, one need only consider the two cases in which the signal (the observable first period price) leads to different posterior beliefs. It turns out that the two constraints (the individual rationality and incentive compatibility constraints) remain unaffected by the unobservability of the contract.

We show that

- The magnitude of the potential entrant's conjectures about the incumbent’s outputs does not affect the choice of the actual first period outputs.

This result is due to the uniform distribution of noise. Since noise is distributed uniformly, the probabilities associated with all possible second period outcomes (and therefore all informational effects) are linear in the conjectured and actual first period outputs. Consequently, the changes in the bank's payoff from shifting the equilibrium output levels are independent of the magnitude of the potential entrant's conjectures.

Nevertheless, signal jamming impacts the bank's choice of the first period output levels. In particular,

- The high cost incumbent's first period output is higher and the low-cost incumbent’s output is unchanged, compared to the public contract regime.

The intuition for this result is that while the bank is unable to affect the entrant's belief that the incumbent has low costs, because this depends only on the conjectured output and not the actual output, the bank is able to affect the probability that the potential entrant remains ignorant of the incumbent's costs. This latter manipulation of beliefs has the same impact on the second period expected payoffs as the determination of beliefs in the case of the observable contract. Consequently, the output of the low cost incumbent is the same for both cases, albeit for different reasons. However, this reasoning does not apply to the high cost incumbent and therefore its first-period output changes as a result of signal jamming.

An implication of the changes of the equilibrium outputs in the first period, due to signal jamming, is that when the contract is hidden the probability that the potential entrant enters is actually increased. That is,

- Signal jamming leads to a higher probability of entry than when the contract is public.

The reason that entry is more likely when the contract is hidden than when it is observable is because signal jamming decreases the distance between the two equilibrium first period outputs when compared to the case of observable contracts. Underlying this is the bank's attempt to manipulate the probability of entry. Specifically, in order to maximize its profits, the bank increases the first period output of the high cost incumbent (while all else remains the same). However, (in equilibrium), this increase in the output has the effect of increasing the probability of entry.

A broader intuition for our signal jamming result is also straightforward. When the first period contract is observable, the contract serves as a public commitment to the specified levels of output. When the contract is private (i.e., hidden) and not observable, no such commitment exists, so that the bank attempts to use the contract to manipulate the probability of entry. Since the bank cannot control the beliefs of the potential entrant, the only way the probability of entry can be affected is by manipulating the first period outputs. Such manipulation is obviously costly in the short run (in the first period). However, it also does not pay off in the long run (in the second period), because in equilibrium, such manipulation is anticipated by the potential entrant. However, the maximization of profits leads to such manipulation nevertheless and the probability of entry increases in equilibrium.

REFERENCES

Bolton, P. and D. Scharfstein (1990), “A Theory of Predation based on Agency Problems in Financial Contracting”, Vol. 80, No. 1, pp. 93-106.

Brander, James and Tracy R. Lewis (1986), “Oligopoly and Financial Structure: The Limited Liability Effect”, American Economic Review, v76, n5, pp. 956-70

Chevalier, J. A. (1995), “Do LBO Supermarkets Charge More? An Empirical Analysis of LBO's on Supermarket Pricing”, Journal of Finance, Vol. 50, No. 4, pp. 1095-1112.

Faure-Grimaud, A. (1997), “The Regulation of Predatory Firms”, Journal of Economics and Management Strategy, 6(4), 849-76.

Faure-Grimaud, A. (2000), “Product Market Competition and the Optimal Debt Contracts: The Limited Liability Effect Revisited”, European Economic Review 44, 1823-40.

Gertner, R., R. Gibbons and D. Scharfstein (1988), “Simultaneous Signalling to the Capital and Product Markets”, Rand Journal of Economics. 19(2), pp. 173-190.

Jain, N., Jeitschko, T. D. and L. Mirman (2000), “Financial Intermediation and Entry-Deterrence”, Working Paper.

Jain, N., Jeitschko, T. D. and L. J. Mirman (2000), “Strategic Experimentation in Financial Intermediation with Threat of Entry”, to appear in AOR.

Jain, N., Jeitschko, T. D. and L. J. Mirman (2000), “Financial Contracting, Signal Jamming and Entry- Deterrence”, Working Paper.

Jain, N. and L. J. Mirman (2001), “Multinational Learning under Informational Asymmetry”, Southern Economic Journal,

Jain, N and L. J. Mirman (2001), “Agency Games” to appear in Volume in honor of Emanuel Drandakis.

Jeitschko, T. D., L. J. Mirman and E. Salgueiro (2001), “ The Simple Analytics of Information and Experimentation in Dynamic Agency”, Economic Theory, forthcoming.

Jeitschko, T. D. and L. J. Mirman, (2001), “Information and Experimentation in Short-Term Contracting” Economic Theory, forthcoming.

Kovenock, D. and G. Phillips (1995),”Capital structure and product-market rivalry: How do we reconcile theory and evidence?” American Economic Review. 85(2), pp. 403-408.

Laffont, J.J. and J. Tirole (1993), “A Theory of Incentives in Procurement and Regulation”, Cambridge, MA, MIT Press.

Maksimovic, V. (1990), “Product Market Imperfections and Loan Commitments”, Journal of Finance v45, n5, pp.1641-53.

Maksimovic, V. and S. Titman (1991), “Financial Policy and Reputation for Product Quality”, Review of Financial Studies v4, n1: 175-200.

Milgrom P. and J. Roberts (1982), “Limit Pricing and Entry under Incomplete Information”, Econometrica, Vol. 50, pp 443-60.

Matthews S. and L. J. Mirman (1983), “Equilibrium Limit Pricing: The Effects of Private Information and Stochastic Demand”, Econometrica, Vol. 51, No. 4, pp. 981-96.

Opler T. and S. Titman (1994), “Financial distress and corporate performance”, Journal of Finance, 49(3): 1015-1040.

Phillips, Gordon M. (1995), “Increased Debt and Product Market Competition: An Empirical Analysis”, Journal of Financial Economics 37, pp. 189-238.

Poitevin, M. (1989), “Financial Signalling and The `Deep Pocket' Argument”, Rand Journal of Economics, 20(1), 26-40.

Poitevin, M. (1990). “Strategic Financial Signalling”, International Journal of Industrial Organization, 8, 499-518.

Zingales, L. (1998), “Survival of the Fittest or the Fattest? Exit and Financing in the Trucking Industry”, Journal of Finance v53, n3 : 905-38.